CLAIMS

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1. (Amended) A method for forming a compound semiconductor layer, comprising the step of crystal-growing a group III-V compound semiconductor layer containing at least nitrogen and arsenic as group V elements on a single crystal substrate,

wherein the step of crystal-growing the compound semiconductor layer includes the step of supplying an aluminum source material to the single crystal substrate concurrently with a nitrogen source material.

2. A method for forming a compound semiconductor layer according to claim 1, wherein an aluminum-mix crystal ratio in a group III element in the compound semiconductor layer is 0.02 or higher.

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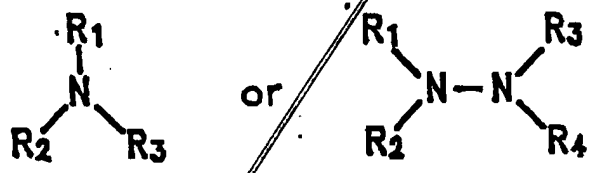
3. A method for forming a compound semiconductor layer according to claim 1, wherein the step of crystal-growing the compound semiconductor layer is performed at a temperature of the single crystal substrate in the range of 500°C or higher and 750°C or lower.

4. A method for forming a compound semiconductor layer according to claim 1, wherein the nitrogen source material contains



where R_1, R_2, R_3 and R_4 are hydrogen or a lower alkyl group.

5. A method for forming a compound semiconductor layer according to claim 1, wherein more than 0% and less than 50% of the crystal growth surface of the compound semiconductor layer is covered with group V atoms.

6. A method for forming a compound semiconductor layer according to claim 1, further comprising the step of crystal-growing a layer formed of $Al_hGa_iIn_{1-h-i}As_jP_{1-j}$ ($h \geq 0$, $i > 0$, $j \geq 0$) on the single crystal substrate, wherein the step of crystal-growing the compound semiconductor layer and the step of growing the crystal formed of $Al_hGa_iIn_{1-h-i}As_jP_{1-j}$ are performed at the same temperature.

7. A method for forming a compound semiconductor layer according to claim 6, wherein the step of crystal-growing the compound semiconductor layer is performed after the step of crystal-growing the layer formed of $Al_hGa_iIn_{1-h-i}As_jP_{1-j}$.

8. A method for forming a compound semiconductor layer according to claim 6, wherein the step of crystal-growing the compound semiconductor layer is performed before the step of crystal-growing the layer formed of $Al_hGa_iIn_{1-h-i}As_jP_{1-j}$.

9. A method for forming a compound semiconductor layer according to claim 1, wherein the compound semiconductor layer further contains indium.

10. (Amended) A method for forming a compound semiconductor layer, comprising the step of crystal-growing a group III-V compound semiconductor layer containing at least nitrogen and arsenic as group V elements on a single crystal substrate,

wherein the step of crystal-growing the compound semiconductor layer includes the step of supplying a nitrogen source material to the single crystal substrate so that the nitrogen source material interacts with aluminum at least on a crystal growth surface of the compound semiconductor layer.

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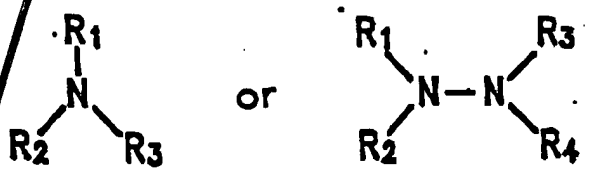
aluminum source material to the single crystal substrate concurrently with a nitrogen source material.

11. A method for forming a compound semiconductor layer according to claim 10, wherein an aluminum-mix crystal ratio in a group III element in the compound semiconductor layer is 0.02 or higher.

12. A method for forming a compound semiconductor layer according to claim 10, wherein the step of crystal-growing the compound semiconductor layer is performed at a temperature of the single crystal substrate in the range of 500°C or higher and 750°C or lower.

13. A method for forming a compound semiconductor layer according to claim 10, wherein the nitrogen source material contains



where R_1, R_2, R_3 and R_4 are hydrogen or a lower alkyl group.

14. A method for forming a compound semiconductor layer according to claim 10, wherein more than 0% and less than 50% of the crystal growth surface of the compound semiconductor layer is covered with group V atoms.

15. A method for forming a compound semiconductor layer according to claim 10, further comprising the step of crystal-growing a layer formed of $Al_hGa_iIn_{1-h-i}As_jP_{1-j}$ ($h \geq 0$, $i > 0$, $j \geq 0$) on the single crystal substrate, wherein the step of crystal-growing the compound semiconductor layer and the step of growing the crystal formed of $Al_hGa_iIn_{1-h-i}As_jP_{1-j}$ are performed at the same temperature.

16. A method for forming a compound semiconductor layer according to claim 15, wherein the step of crystal-growing the compound semiconductor layer is performed after the step of crystal-growing the layer formed of $Al_hGa_iIn_{1-h-i}As_jP_{1-j}$.

17. A method for forming a compound semiconductor layer according to claim 15, wherein the step of crystal-growing the compound semiconductor layer is performed before the step of crystal-growing the layer formed of $Al_hGa_iIn_{1-h-}$

$_{1}As_{j}P_{1-j}$.

18. A method for forming a compound semiconductor layer according to claim 10, wherein the compound semiconductor layer further contains indium.

19. A method for forming a compound semiconductor layer, comprising the step of crystal-growing a group III-V compound semiconductor layer containing at least nitrogen and arsenic as group V elements on a single crystal substrate,

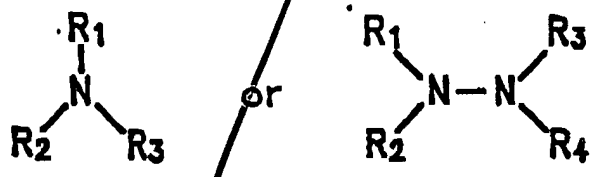
wherein the step of crystal-growing the compound semiconductor layer includes the step of supplying a nitrogen source material to a crystal surface of the compound semiconductor layer in a state where the group III atoms containing aluminum are exposed to the crystal surface.

20. A method for forming a compound semiconductor layer according to claim 19, wherein an aluminum-mix crystal ratio in a group III element in the compound semiconductor layer is 0.02 or higher.

21. A method for forming a compound semiconductor layer

according to claim 19, wherein the step of crystal-growing the compound semiconductor layer is performed at a temperature of the single crystal substrate in the range of 500°C or higher and 750°C or lower.

22. A method for forming a compound semiconductor layer according to claim 19, wherein the nitrogen source material contains



where R_1, R_2, R_3 and R_4 are hydrogen or a lower alkyl group.

23. A method for forming a compound semiconductor layer according to claim 19, wherein more than 0% and less than 50% of the crystal growth surface of the compound semiconductor layer is covered with group V atoms.

24. A method for forming a compound semiconductor layer according to claim 19, wherein the step of crystal-growing the compound semiconductor layer further includes the

step of supplying a group III source material containing aluminum and the step of supplying an arsenic source material, wherein a process sequentially including the step of supplying the group III source material, the step of supplying the nitrogen source material, and the step of supplying the arsenic source material is performed at least once.

25. A method for forming a compound semiconductor layer according to claim 24, wherein the single crystal substrate has a {100} plane as a principal plane.

26. A method for forming a compound semiconductor layer according to claim 19, further comprising the step of crystal-growing a layer formed of $Al_hGa_iIn_{1-h-i}As_jP_{1-j}$ ($h \geq 0$, $i > 0$, $j \geq 0$) on the single crystal substrate, wherein the step of crystal-growing the compound semiconductor layer and the step of growing the crystal formed of $Al_hGa_iIn_{1-h-i}As_jP_{1-j}$ are performed at the same temperature.

27. A method for forming a compound semiconductor layer according to claim 26, wherein the step of crystal-growing the compound semiconductor layer is performed after the step of crystal-growing the layer formed of $Al_hGa_iIn_{1-h-}$

$_iAs_jP_{1-j}$.

28. A method for forming a compound semiconductor layer according to claim 26, wherein the step of crystal-growing the compound semiconductor layer is performed before the step of crystal-growing the layer formed of $Al_hGa_iIn_{1-h-i}As_jP_{1-j}$.

29. A method for forming a compound semiconductor layer according to claim 19, wherein the compound semiconductor layer further contains indium.

30. (Amended) A compound semiconductor apparatus, comprising at least one group III-V compound semiconductor layer containing at least aluminum as a group III element and containing at least nitrogen and arsenic as group V elements.

31. (Amended) A compound semiconductor apparatus according to claim 30, wherein the compound semiconductor apparatus is a light emitting device including at least a light emitting layer, and the light emitting layer includes the compound semiconductor layer.

32. (Added) A compound semiconductor apparatus according to claim 31, wherein the light emitting layer is formed of $Al_xGa_yIn_{1-x-y}N_zAs_{1-z}$ ($0 < x, y, z < 1$), wherein an Al-mix crystal ratio x in the light emitting layer is 0.02 or higher and 0.20 or lower.

33. (Added) A compound semiconductor apparatus according to claim 31 or 32, wherein the light emitting device further includes a cladding layer, a guide layer and/or a barrier layer formed of $Al_hGa_iIn_{1-h-i}As_jP_{1-j}$ ($h \geq 0$, $i > 0$, $j \geq 0$).